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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,282	02/10/2004	Jesse D. Adams	UNR01-006	5447

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EXAMINER	
MOSS, KERI A	

ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/777,282	ADAMS ET AL.	
	Examiner	Art Unit	
	Keri A. Moss	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4, 6-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's Preliminary Amendment filed April 12, 2007 is hereby acknowledged. Claims 1-14 and 16-27 are pending.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims **1-3, 6-18, 20-27** are rejected under 35 U.S.C. 102(a) as being anticipated by Lange et al. (Complementary Metal Oxide Seminconductor Cantilever Arrays on a Single Chip: Mass-Sensitive Detection of Volatile Organic Compounds, Analytical Chemistry, Vol. 74, No. 13, May 18, 2002).

Lange teaches a method of detecting a chemical species with an oscillating cantilevered probe, comprising: driving a cantilevered beam into oscillation with a drive mechanism coupled to the cantilevered beam; tapping a free end of the oscillating cantilevered beam against a mechanical stop, the mechanical stop coupled to a base end of the cantilevered beam; measuring a first amplitude of the oscillating cantilevered beam with a sense mechanism coupled to the cantilevered beam; exposing a treated portion of the cantilevered beam to the chemical species, wherein the cantilevered beam bends when exposed to the chemical species; measuring a second amplitude of the oscillating cantilevered beam with the sense mechanism; and determining the chemical species based on the first amplitude and the second amplitude (pages 3084-3085). The cantilevered beam comprises a material selected from the group consisting of silicon, polysilicon, silicon nitride, a metal film, a metal sheet, a zinc oxide film, a PZT film, a polymeric layer, and a combination thereof (Fabrication section, p3087). The drive mechanism is selected from the group consisting of a piezoelectric drive, an electrostatic drive, a thermal drive, and a magnetic drive (Fabrication section, p3087). The sense mechanism is selected from the group consisting of an optical sense mechanism, a piezoelectric sense mechanism, a piezoresistive sense mechanism, a capacitive sense mechanism, and a magnetic sense mechanism (Results and Discussion, p.3089-3090). The treated portion of the cantilevered beam comprises a coating selected from the group consisting of a gold layer, a palladium layer, an alcohol-absorbent polymer, a water-absorbent material, a chemical-sensitive layer, a biosensitive material, and a thiol (Fabrication, p. 3087) The chemical species is

selected from the group consisting of mercury, hydrogen, an alcohol, water vapor, a chemical element, a chemical compound, an organic material, an inorganic material, a biological material, a DNA strand, a bioactive agent, and a toxin (p.3084). The method further comprises adjusting a position of the mechanical stop with a positioning element coupled to the mechanical stop to maintain the oscillating cantilevered beam at a nominally constant amplitude; and determining the chemical species based on the position of the mechanical stop (Mass-Sensitive Behavior, pgs 3087-3089). The method further comprises measuring a frequency of the oscillating cantilevered beam with the sense mechanism coupled to the cantilevered beam; and determining the chemical species based on the measured frequency (Mass-Sensitive Behavior, pgs 3087-3089). The method further comprises: heating a heater coupled to the cantilevered beam to initialize the treated portion of the cantilevered beam (Gas Tests p. 3089). The drive mechanism and the sense mechanism comprise a unitary piezoelectric element coupled to the cantilevered beam (Figure 3). The treated portion of the cantilevered beam comprises a coating selected from the group consisting of a gold layer, a palladium layer, an alcohol-absorbent polymer, a water-absorbent material, a chemical-sensitive layer, a biosensitive material, and a thiol (Fabrication section, p3087). The system of further comprises an enclosure enclosing the cantilevered beam and the mechanical stop, the enclosure having an inlet port for the ingression of the chemical species and an outlet port for the egression of the chemical species (System Design p. 3085). The system further comprises: means for measuring a frequency of the oscillating cantilevered beam; and means for determining the chemical species based on the

measured frequency (System Design p. 3085). The system further comprising: a heater coupled to the cantilevered beam, wherein the treated portion of the cantilevered beam is initialized when the cantilevered beam is heated (Gas Tests p. 3089). The system further comprises: a positioning element coupled between the base end of at least one cantilevered beam and the mechanical stop, wherein the positioning element adjusts a position of the mechanical stop to maintain an oscillation of the at least one cantilevered beam at a nominally constant amplitude (System Design p. 3085).

5. Claims **1-4 and 6-27** are rejected under 35 U.S.C. 102(b) as being anticipated by Thundat et al (USP 5,719,324). Thundat teaches a method of detecting a chemical species with an oscillating cantilevered probe, comprising: driving a cantilevered beam into oscillation with a drive mechanism coupled to the cantilevered beam; tapping a free end of the oscillating cantilevered beam against a mechanical stop, the mechanical stop coupled to a base end of the cantilevered beam; measuring a first amplitude of the oscillating cantilevered beam with a sense mechanism coupled to the cantilevered beam; exposing a treated portion of the cantilevered beam to the chemical species, wherein the cantilevered beam bends when exposed to the chemical species; measuring a second amplitude of the oscillating cantilevered beam with the sense mechanism; and determining the chemical species based on the first amplitude and the second amplitude (abstract). The cantilevered beam comprises a material selected from the group consisting of silicon, polysilicon, silicon nitride, a metal film, a metal sheet, a zinc oxide film, a PZT film, a polymeric layer, and a combination thereof (Column 8).

The drive mechanism is selected from the group consisting of a piezoelectric drive, an electrostatic drive, a thermal drive, and a magnetic drive (Column 3 and column 4). Measuring the amplitude of the oscillating cantilevered beam comprises directing a beam of light onto a surface of the oscillating cantilevered beam and detecting the beam of light when the beam is reflected from the surface of the oscillating cantilevered beam (column 4). The sense mechanism is selected from the group consisting of an optical sense mechanism, a piezoelectric sense mechanism, a piezoresistive sense mechanism, a capacitive sense mechanism, and a magnetic sense mechanism (column 3). The treated portion of the cantilevered beam comprises a coating selected from the group consisting of a gold layer, a palladium layer, an alcohol-absorbent polymer, a water-absorbent material, a chemical-sensitive layer, a biosensitive material, and a thiol (columns 4-5) The chemical species is selected from the group consisting of mercury, hydrogen, an alcohol, water vapor, a chemical element, a chemical compound, an organic material, an inorganic material, a biological material, a DNA strand, a bioactive agent, and a toxin (Example). The method further comprises adjusting a position of the mechanical stop with a positioning element coupled to the mechanical stop to maintain the oscillating cantilevered beam at a nominally constant amplitude; and determining the chemical species based on the position of the mechanical stop (Column 7). The method further comprises measuring a frequency of the oscillating cantilevered beam with the sense mechanism coupled to the cantilevered beam; and determining the chemical species based on the measured frequency (columns 5-7). The method further comprises: heating a heater coupled to the cantilevered beam to

initialize the treated portion of the cantilevered beam (column 3). The drive mechanism and the sense mechanism comprise a unitary piezoelectric element coupled to the cantilevered beam (Figures 3 and 6). The treated portion of the cantilevered beam comprises a coating selected from the group consisting of a gold layer, a palladium layer, an alcohol-absorbent polymer, a water-absorbent material, a chemical-sensitive layer, a biosensitive material, and a thiol (column 4-5). The system of further comprises an enclosure enclosing the cantilevered beam and the mechanical stop, the enclosure having an inlet port for the ingression of the chemical species and an outlet port for the egression of the chemical species (columns 2-3). The system further comprises: means for measuring a frequency of the oscillating cantilevered beam; and means for determining the chemical species based on the measured frequency (columns 5-7). The system further comprising: a heater coupled to the cantilevered beam, wherein the treated portion of the cantilevered beam is initialized when the cantilevered beam is heated (column 3). The system further comprises: a positioning element coupled between the base end of at least one cantilevered beam and the mechanical stop, wherein the positioning element adjusts a position of the mechanical stop to maintain an oscillation of the at least one cantilevered beam at a nominally constant amplitude (columns 5-7).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keri A. Moss whose telephone number is 571-272-8267. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Keri A. Moss
Examiner
Art Unit 1743

10/1/07

Jill Warden
Supervisory Patent Examiner
Technology Center 1700